<110>   MACKAY, CHARLES REAY

<120>   TRANSGENIC NON-HUMAN MAMMAL COMPRISING A POLYNUCLEOTIDE
        ENCODING HUMAN OR HUMANIZED C5AR

<130>   RICE-050

<150>   AU 2003907150
<151>   2003-12-24

<150>   AU2004/001844
<151>   2004-12-24

<160>   7

<170>   PatentIn version 3.1

<210>   1
<211>   21005
<212>   DNA
<213>   Mus musculus

<220>
<221>   misc_feature
<222>   (5484)..(5484)
<223>   n = a number of unknown nucleotides, data available from the mouse
        locus suggests about 626 nucleotides in length

<220>
<221>   misc_feature
<222>   (7392)..(7392)
<223>   n = a number of unknown nucleotides, data available from the mouse
        locus suggests about 100 nucleotides in length

<220>
<221>   misc_feature
<222>   (9861)..(9861)
<223>   n = a number of unknown nucleotides, data available from the mouse
        locus suggests about 233 nucleotides in length

<400>   1
tttattttta tttttttaaa aaattggtcc ttcctatgca ggtggcctgg aattttttaat   60

cctcctgctt ttgtccaagt aatagaatta caggcatgta taattgtgcc taacctgagc   120

caattttgtc tttgctaaaa agcacaggtt ctcaacctgt gggtcctgac ccctgggggg   180

agggtgtcac atctcagata tcttgtatat ctgatattta cattacagtt atgaagtaac   240

aatgaaatgc ttttgtggtt gggggtcacc acaatatgtg gaaccaactg ttttcagggt   300

cacagtgtca ggaaggttga gagccactgc tacaaaggat ctcacaaagc ctactctgga   360

ttagaagtta ctgtgcagcc aggaggatgg ctttgaactt attctcctgc ctcagccgcc   420

tgggtgctgg ggtcggatgc agcactacat caggttttat gcggtgctgg gaatggtatc   480

1

```
caggggctttg cacatgctag gcaagtgttt aaccaaccaa gccatgatcc cagcatgctt      540

tgctttatta tttgagacag gtcctgttct gcagcccagg gtgatcctcc tgccccagtc      600

tcctgagtgc tagcattgag ttaacacatc tccctaaccc ccttaagaga aaacgccaag      660

accttggcca tctcttcagc cctctgtgtg ctttcttgct ataaaagcca ccaggctggg      720

gagctgtggt cattatttct gtcatgtaga aaccccagaa actccaaaac ttccttcaga      780

agaggtaggc tcctcctcag attggggaac gaggccagga aaagcagctg cgtccccaaa      840

agtgaagaag tcctggaaat tgccttttcc ccttctgggg ccagagactt ccttcctttt      900

ccaagttgac atctctcccc tggctggttg gtactgggtg gtgctgaggg tgtactgggt      960

aagcaccggt ggagggagcc tcagctagga tggtcagtga gtgaccaatg agcacctcca     1020

ggagacaaga cagtcatttc ctctcagttg cctgcatctc ttcttgaggg tttaaaaggc     1080

acagcctggg tgacagggac cttcaggcat ccgtcgctgg ttaccacaga acccaggagg     1140

agccaggaca tggtgagtgg attcctctcc ctgtctgact ttctttgccc atttctagct     1200

cctttcccat cctgagctca cactctgaga tgggatgtgg ccaacggact aaggggattt     1260

atgggaacca cggcggcctc accaagatgt aggctcaaga aggttcttca ggacaggaga     1320

ccctggagtc agctctcctc actgaagagt tctagaagtt gggcatgttc atttacactt     1380

gtaatctgag ccctcaagag gccggggcag gatgctgcag tcaaggctac atagtgactt     1440

ttaggctagt gtgagctaca ctatgagata ctgtgttcag agacaaatgg gctggaggta     1500

gagatcaggt gtgagagtgc tctgtgggag agctggaagc catgggtcca atgaccagca     1560

cctcgtacag ctgggtggga gtgattggaa attcaatctt acatagtaat tttgaggtta     1620

acctgggcta cactacatga gaccctactt cagaaaagca agaacaaaaa aataattta     1680

caaactagcc aaggtggtgg ctcaaacctg ctatcctggc tcctagcagg aggtttgaga     1740

tttggggcga gcctaggcaa ctttgttgag actttgtctc aaagactaaa agcaaaacaa     1800

aacaaaaact caaacagtgt gaataaagga aggaagaatg aaacaattgc agaaacctgt     1860

tgggattgta gctcactgcc tagcctgagt gtggcccagg gttccgtctc ctacgctgag     1920

tctaaaacta ccaagcagag actgggtgct gtgacgcaca ccttttaatc ccgcactcag     1980

gaggcagaat cgggaggttc tctgtgagtt cgaggccagc ctggtaaaca tgtaaagaag     2040

tctaaggaag gtcaatgttg agagtcttga cagccagttt gaaagaacgc ccattcccag     2100

aaaagttaga ggaagcccag atgggagcac tgatggcctg ggtccttctg tggttaatgg     2160

ccatgaccct ctaggcaggt ccctctccat gcctgggacc tgacgttgag gcatggtgct     2220

agaccagcgg cgacttggcc ccactgtaac agaggatacg gtcttgcttc atccacacaa     2280
```

2

```
aagaggaaac ggaaaacttg atgacaggga gggtacacgc tttcttcatc cttcttctgt   2340

cccatccaat cctgtgtctg ccccgagcaa ttggggtttc cagaacaggg tgggttcttt   2400

ttcctttcta cacaacgttt ctgaagacga agtcacttta ttgaccaccc gaactgtaga   2460

gtccctgatt tgggctgggg cgtgactgag ttttttgttt tttgtttgtt tgtttgtttg   2520

ttttaaatac tggaataggc tgtcagtatc tttttttttt tttaagattt atttattata   2580

tataagtaca ctgtagctgt cttcagacac tccagaagat ggcatcagat cttgttacag   2640

atggttgtga gctaccatgt ggttgctggg atttgaactc cagaccttcg gaagagcagt   2700

cgggtgctct tacccactga gccaactcac cagccctttt tttttttttt tttttttttt   2760

ttttttttaa agatttactt attttatata tgtgagtagt attgtctctt cagagacacc   2820

agaagagggc atcagaccca attacagatg gttattagcc accatgtggt tgctgggaat   2880

tgaactcggg acctttggaa gagcagtcag agctctaaac cgctgaacca tctctgcagc   2940

ccgtgactgg attcttaggc cagtagtcta tggctaagct atgcccctca cccctcactg   3000

ggggattcta ggcaggggct ctaccactga gccacactcc cagcccctca ctgggggatt   3060

ctaggcaggg gctctaccac tgagccacgc ccccagcccc tcactggggg attctaggca   3120

ggggctctac aacatttcag tccttgatct tttaagacag gatgtcacta tgtagcccaa   3180

tggtctaaat cacatgatta tcctcaggct ccctggtgct gggatcacag gcatatacca   3240

ccgtggctag cccctaaaca taattttct tttgaatgaa taattttttt cttttggttt   3300

ttcaagatag gatttctctg tgtagccttg gctgccctgg aacttgctct ataaaccagc   3360

ctggcttcaa actcacagat cctcctgcct ctacctcctg agtgctggga ttaaaggcat   3420

gtgccatcac tgcctagctt tgaatgaata ctttttttta atattgtgaa taggcatttta  3480

ctgagtgctt attgtatgct agtcctcttg ctaagcactt tagatttact acatagcaaa   3540

ctatcaataa aggagctgta gaatatccat gtatttcaag ggcaacacag cctttgaaca   3600

gacatatact atcccaatgg cattccacgc attaggcggt ataacctttt aaagagaagg   3660

ctcttgggat tcggccccac ccctgctctt gctgataggt tttgggaggc tttctaacta   3720

acctagagcc ccactttta aaatctgtag agtgggtgtg ccatagtag cagcccaatg   3780

agggttgcat gtgttaaatg aagaaaagag cagttgaaag cccctcacaa gtggcccata   3840

cctgtaatcc cagcactcag gagaaagagg ccctgtctca aaagaaaata caaaaagcat   3900

gtaaacttat ggaccaggct aattatttta ttttgttttt ttaaaaaaga tttatttatt   3960

tatttattac atgtaagtac actgtagctg tcttcagaca ctccagaaga gggagtcaga   4020

tctccttacg aatggttgtg agccaccatg tggttgctgg gatttgaact aaggaccttc   4080

agaagagcag tcaggtgttc ttacacgctg agccatcgca ccagccccag gctaattatt   4140
```

3

```
gttattttga aataggttct catgtagata aggctgaacc tagaactcac tatgtagcca   4200

aggatagctt tgacttcctg tcctcctgct ccacctctgg tctctctctc tcgatatata   4260

cacacatata tgttcatttt atatattata ttgtataata gtttatagtc ttctttttttt  4320

cttttttttt ttttttttttg ggttttcaag acagggtttc tctgtgtagc cctggctgtc  4380

ctggaactca ctctgtagac caggctggcc tcgaactcag aaatccgcct gcctctgcct   4440

cccgagtgct gggattaaag gcgtgtgcca ccacgcccgg ctatagttca tattctttaa   4500

gcaactattt ttatatcatt tatttatttg tcttacaaga tttgtttttta attgtgtgta   4560

cgcttttgag tctgtctgtc acacgcgtgc agatgccctc agaggacaga aggtgttgga   4620

ttttcggagc tggagtttca ggcagttgtg agatcccctt gggtgctgag aagtgaacac   4680

atgtcctctg cggaagctga cagtgctctt cattgctgaa ccatctctcc acttccttct   4740

tagtctttttt tttctcaatt gttttttctcc ttaaaaaata ttttgacctt atgattagtt   4800

gagtccacag acatggacac tgtgtatacg gagggacaat gacatcttct ataatagttc   4860

aaattatgta tgcatataat atgttacata tattgtattc cacatccaag aaccatataa   4920

acaggagaaa gtgctctctc tctctctctc tctctctctt aaagatttat ttatttgtta   4980

tatgtaagta cactgtagct gtcttcagtc actccagaag agggcatcag atctcattat   5040

ggatggttgt gagccaccaa gtggttgctg ggatttgaac tcaggacttt ccaagagcgg   5100

tcagtgctct tacctgctga gccattctcc agcccaggag aaaactctct taattcccga   5160

gtcccagtcc cttccttaga ggcagccact actgtcagta tgtgaggcta gtctgtatgt   5220

acacgtgaat ggacacacac acattcatgc acatgttgtg catccttcct tctacaggta   5280

atatacattg tgcattgtcc actgctattt cctattttaa acaaagtttc cctagatatc   5340

aaagaccttt ctgtatcatt tcattaacaa ctaccttatt cttttaaaaa ctgcatagtg   5400

ctttgttgcc tagaggctat tactaagtta ctcagtccct tttggtcagt tcaaaatatc   5460

attatcatct cctcctctgc ctcntgtatc tggaagcccc aggaaaccac agagtttacg   5520

atcagcatct ttttctctgc ctcatgaagt cacgaaaagg acagggtgag atcatgtcag   5580

gaagcaagaa aggagaaggt cagccggcaa ggatgagaga tggggttaga gaggcccgtg   5640

tcagaagtct gagtcattgt agtaaggatg gtgagatctg cagatgccag gagaagcatt   5700

ccaccctgtc tggggccttg agaataccca gagggcaggc tgtgaggttt cctatagggc   5760

ccagaattaa tcctcaagtg acctgagcat gggaccctgg ggatgtgggg atgcccagag   5820

taacaagtag aaagatacag aactgagggt gagccagagt gaaatgagtg gctgggtcct   5880

gggtctgtct gtctgtctgt ctgtctgtct ctctctagct ttctttttgt ttttctctgt   5940
```

4

```
gtagccctgg ctgtcctaga actcactcta taaacccggc tgacctcaaa ctcagagatc   6000

tgtcctcccc tgccacccgt gctgggattg aaggtgtgca tcacatcacc accctcctgc   6060

ttgaaatatt tttaaattat agaaaagtgt gaggctagta caagaagttt atttatcttc   6120

ttttgttgtc gttgttattt attattactg agatggggtc tcgctatgta gctcaggctg   6180

acactcaatg taatgcatag cccaggctgg tctggggcgc cacatcttcc tgttcagcct   6240

cctcagtgtt ggcattacag gcgagcatta ccataaattc ttgtgtttcc tccccaagag   6300

tccccacatg cagtctatgg tgtatatatg tttacccatg tatatactta taaatctttg   6360

tatgtatcta tgtttctgtt tctataaaca tatcagttta gctgcatatc gacatatctg   6420

tttttctatc tgtcaatata gctatcaatt atgctccatc cattgtttct ctaccattca   6480

tctctagcta ttcatcatct acccaggcat tttctattct tctattagtt tagcctggtc   6540

ttgaacccoc aacctagctg aggatagctc tttttttttt ttttataatg gtactgaagt   6600

ttattttttt taaagattta tttatttatt acatgtaagt acactgtagc tgtcttcaga   6660

cacaccagaa gagggcgtca gatctcgtta cagatggttg tgagccacca tgtggttgct   6720

gggatttgaa ctctggacct tcggaagagc agtcgggtgc tcttacccac tgagccatct   6780

caccagccct gaggatagct cttaactctt gatcttcttg cctccaccac atagattcag   6840

gggttacagg tgcactaccg tgtccagtct atgtagcact ggggatggaa cccaagggtt   6900

catacatgat aaatgagcac tctacaagat gagctatgtt cctaacccat ctgcctgtct   6960

ttctatcacc tatgtcccat ccgttgatct ataaatcttt ttattcatct ttcacccacc   7020

cacccaacca ttcacccatt cattcttagt aaccaaggct ggtcttgaac tcttgatttt   7080

cccacccgag tcttcccagt cctgagatga tacaagtgca catcaccata cccgtgtcaa   7140

aatctacttc taattcttat ttctgttttt aaaaagaaaa gttatctgtt ttatgtatat   7200

atgtgtctgt tgagtgtata tatgtgcacc aagtgcctac aggagcctgc aaagatcagt   7260

tgtcagattc tgccattgga gttctaaaca gttgcgagct gtcacaactc tggtcctcta   7320

caggagcagc aactgctctt aactggtgac ccatctcttc taatttctct ctctctctct   7380

ctctctctct cncctctctc tctctccctc cctccctccc tctcttcctt ccttcctccc   7440

ttccttcccc cctcccttcc ttccttcctt cattccttcc ttttgttttt tgtttgtttg   7500

tttttttttta attaggtatt ttcctcattt acattttcaa tgctatccca aaggtccccc   7560

atacccaccc ccccaatccc ctaaccaccc actccccctt tttggccctg gcgttcccct   7620

gtactggggc atataaagtt tgcaagtcca atgggcctct ttttgcagtg atggccgact   7680

aggccatctt ttgatacata tgcagctaga gacaagagct ccagggtact ggttagttca   7740

tattgttgtt ccacctatag ggttgcagtt ccctttagct ccttgggtaa tttctctagc   7800
```

5

```
tcctccattg ggggccgtgt gatccatcca atagctgact gtgatcatcc acttctgtgt ·   7860

tttgtttgtt ttttttgagac agggtttcat cgtgtagccc tggctgtcct ggaactcact       7920

ctggagacca ggctggcctc gaacacacag ggatctacct acctctgcct cccaagtgct       7980

gggattaaag gcatgctcta ccaccacctg gctagttctt atttcttatt ttgccttttg       8040

ctggccccaa atactttgcc tccacttcca attgtaagtc ccaaaactta gggtttggaa       8100

aatgggtggc ttgctagact gtcaaggaga taatgaagga agaaagggag gctcagagcc       8160

agagaaattt gcaaaggaac ctgtatgccc cataggtctg gatcacaggg gataactcca       8220

aagccagtat ccaaaggaca gcctatcctc agctgggggt ggagtctttg cctgcttccc       8280

gcctatacta aaatgtcgaa ctattttttc tctttctctc tctctctttc tatttttttct      8340

tttaaagatt tatttatttta ttttatgtat atgagtacac tagggcatta gatctcatta      8400

cagatggttg tgagccacca tgtgattgct ggaatttaaa ctcaggacct ctaggagagc       8460

atccagtgct cttaacctct gagccatctc tcagccctct ggttttttgt tttgttttgt       8520

tttgttttttt tgttttttta aagacagtat ctcattgtct ttgttagcag ctctgtcctg      8580

tcctagaact cactatgccc aacacactga cctcaaatac atgcttatcc acctggctct       8640

gcctcccaaa tgctgggatt aaacatgtgt accaccacta cctggcatct ctgtccatca       8700

ttttaatcaa agagaaaaat gtataaaact ttttcttaag tagcccagac tggtaatgag       8760

gatcactgtg catctgagga tgagtctgtt gcctctgtct cccagattct ggggtgggag       8820

tcaccatttc tagtttaatg ttgtgctggg tttggagtct gtggcttcat gctttgagac       8880

tggtttcctg taaggcaggc gatcattgaa tgcttcccca ccctgcctcc tgttactgaa       8940

tgtcaggatt gtagccatga ccgccatgc ccgctttaat ataagatcat ttaaagcagt        9000

agttctcaat ctgttgtcag agagtagcaa gcttacagtc aggaagtagc aacaaaagtc       9060

attttatggc tgggggtcac cacaacatga ggaactgtgt taaaggtctc agccttcgga       9120

aggttgagaa ggaaacctca aacccacaga tatcggtcac agttctcaaa ggaccacatt       9180

gcccaatatg tttatacacc atggtcacat ttccagccca ccgaggacac caggataaag       9240

cttcactgcc aacaatgagg tgtttcaaaa ttagatgtca ttgtcctgtc tttataccaa       9300

ctttgggttt tagtccaaat tcaggcata cacatctata attctagcac acaggaggta        9360

gaggcagggg gatcagtagt ttatcatctt gagctacata gtgagttttg gactagcct        9420

ggtatacagt ggattctgtc aaaaaactaa atgacaaaga agtaacaaca acaacaacaa       9480

aataataata ataataataa taataataat aataataata atattattat tattattatt       9540

attattatta ttattattat tattatttgt gtgtgtgtgt agtgtctgga cacataggtc       9600
```

6

```
aagctgagct tgaactcagg acaatcctca tacactgttt tgagctcttt atatcactgg   9660

gagctggaga gtgtagctca ggagctcaac agtacctgcc agagtgacag gagttcagtt   9720

ccaagcacct atgtagagta tgctcacaac cagatgtaat tccaaagtgt tcaatgccct   9780

cttctagcct cccagggcac cctcctctct ctctctctct ctctcctctc tctctctctc   9840

tctctctctc tctctctctc nccccccata cagtaccaat ggtaagatgg tttagcaggt   9900

aatcgcccaa gcctggagac ctgagttcta tcttaggacc cacataaagg ttaagggaga   9960

gaacgcagtg cacaaagtta tcccctggct ttcacatgtg tgttatggca tgcacatgca   10020

tacatacata catgcataca tacatacata catacataca tacatacata gacagtgaca   10080

aattaaaata atacctcatt ggtcagtcac tgcacccctt taatcccagc actcagaagc   10140

cagaggcagt tggaactctg taagagtgga gccagcctgg tctacagagt gagacttttt   10200

ctttttttct tttttttta aagatttatt catttattat acgtaagtac actgtagctg   10260

tcttcagaca ctccagaaga gggagtcaga tctcgttacg gatggttgtg agccaccatg   10320

tggttgctgg gatttaaact cctgaccttc ggaagagcag tcggttgctc ttacccactg   10380

agccatctca ccagccccga gattttttct catcacctcc ctaccccaat ccatatactt   10440

gattaaagcc caggtctgga gagccatgcc tgtagtctca gcattgggca gctgaagtag   10500

atggaccacc atgatttcag tttatcctgg gcttcagagt gagtttaaga ccagtctggg   10560

taatttaaca gagaacctgt ctcaaaataa aatctacaaa ctatactagt tttataggtg   10620

ttcagcatcc cttggtagag ttgagactca gaaagacggg caatgcctcc atccctgggg   10680

aatgtgtcta ccaactcaca caatctacct gtttgatttg cttaggaccc catagataac   10740

agcagctttg aaatcaacta tgatcactat ggaaccatgg atcctaacat acctgcggat   10800

ggcattcacc tcccgaagcg gcaacctggg gatgttgcag cccttatcat ctactcggtg   10860

gtgttcctgg tgggagtacc tgggaatgcc ctggtggtgt gggtgacagc cttcgaggcc   10920

agacgggccg tcaacgccat ctggtttctg aatctggcgg tggccgacct cctctcgtgc   10980

ttggcactgc ctgtcctgtt cacgaccgtt ttaaatcata actactggta ctttgatgcc   11040

accgcctgta tagtcctgcc ctcgctcatc ctgctcaaca tgtacgccag tatcctgctg   11100

ctggctacca ttagtgccga ccgtttcctg ctggtgttca gcccatctg gtgtcagaag   11160

gtccgcggga ctggcctggc atggatggcc tgtggagtgg cctgggtctt agcattgctc   11220

ctcaccattc catccttcgt gtaccgggag gcatataagg acttctactc agagcacact   11280

gtatgtggta ttaactatgg tgggggtagc ttccccaaag agaaggctgt ggccatcctg   11340

cggctgatgg tgggtttttgt gttgcctctg ctcactctaa acatctgcta caccttcctc   11400

ctgctccgga cctggagtcg caaggccacg cgctccacca agacgctcaa agtggtgatg   11460
```

7

```
gctgtggtca tctgtttctt tatcttctgg ctgccctatc aggtgaccgg ggtgatgata   11520

gcgtggctgc ccccgtcctc gcccaccttg aagagggtgg agaagctgaa ctccctgtgc   11580

gtgtccctgg cctacatcaa ctgctgtgtt aaccctatca tctacgtcat ggctggccag   11640

ggtttccatg gacgactcct aaggtctctc cccagcatca tacgaaacgc tctctctgag   11700

gattcagtgg gcagggatag caagactttc actccgtcca cgacggacac ctcaacccgg   11760

aagagtcagg cggtgtagag gagaagccac aactggccta gctgctcctt ttccagccct   11820

cctacccct cctcttcttc ctcctcctgc ctctcctcct tccttccttc cttctctttg   11880

catgtttaat tttctgcaat tctctaagtt gctctgacta gccttgagcc caggatcctc   11940

atgaaggctg agattataaa tataaattcc tttgatgaaa agcatcacat taagatagta   12000

ctcggctttt tttctaaggc tttttttttt tttcttggct acgttgccca cctgcagtgg   12060

ctaggcagat acacctaatg atgacctcca ggggttggat aacagagaac aagagaattt   12120

cctggccttc ttcttcctct cttcctcttc tttttccctc ctcctccttc ttctcctcct   12180

cctccctttt tttttttatg gttctggtct gaacccaggt ctcaatggaa cccagggctt   12240

atggatatat cacataagca agctacagcc ccaaacccca ggcaaccagt atccacccac   12300

cctttatttc ttttctatgt ttgatttttt tttttttga dacaaggtct catgtagggt   12360

agtctggcct tgaactccag atcctcctgt gaccatctcc caagtgtcgt gactgtagac   12420

ctgtgctgtt gtgtccgacc tatcctttat ttctacaatt ttgtgttttc aggaatggta   12480

tttaatggaa cccaacatat ccaagctttg taaaaacaac tatgcatggc ttacttgata   12540

aatttttttt ttttaaaaag gtacagaaat gtgttgttta acttttaaaa agcacgtatt   12600

tatttatttt gtggggggtg agggggtggt gctgggcaaa tgtcatggta tatgtgtgga   12660

ggtcagagga caacctgttg aaattggttc tctcattgca accatgaagg tcctcatgga   12720

atcgaaccca ggtcatcata cttggcagca aacacctta cctgctgagt cacatcactg   12780

gccagaggtg tcctgtctta taatgcgttc tttcagctta atgaatgtgt gtgcatgagt   12840

gtatgtgttg gctagaaaat atgtacagat caacaccaga agtatcatgc aagcatggga   12900

atggttttga atttcctggt caaattaaaa atgtgaaaga agacctgggt gtggtggcgc   12960

aaacctatat cccagcatgt gggaggttca ggggccagaa ttgagtttta gaacccagcc   13020

tggcttaccc agggagactg tctcatgaga tccaaataaa cagtatatga tggaaaacac   13080

tggagtttag ctctgctagg ccctctcttc ttcccagtgg atatgtgacc actggttgtc   13140

acatatcaca gacccagcct acctgtgttc tgctattcac actttctata tgatgacact   13200

aacctcactg aatttttaca ggctccatgc cttggcattt attatttatg tatttatttta  13260
```

8

```
ttttgagaca  ggatctcttt  acatagccct  agctgtcctg  gaactcacta  tgtgaaccag  13320

gctggcctag  aactcacaga  gatgggcctg  cctccatctc  ctgagtgcta  ggattaaaga  13380

catgagccac  cacatccagc  tttattctat  gttttgtatg  gcctctatga  gtttgaaaca  13440

tttaatcaat  tagttagtta  attaattaat  atatgagatg  ggatctcatg  tagcccaggc  13500

tagccttaag  ctggttttac  agctgaggtg  ggattatagg  tagtcctcct  gactcccagt  13560

tgtctccctc  ttgtggcttt  tctcattatc  ggtcacatct  gtattgccac  agctgagctt  13620

ctcacccact  gacccatgcc  ccagctgtcc  caagaacctc  ttcctcccct  tgcttttcca  13680

ttccaggaaa  aaccacactg  gcaacctgct  cacccaggcc  ctttcagctg  ccccatcaca  13740

gacccagccc  tcccttctta  ccacacaccc  ggctctacat  cctgccccc  cccccgcac   13800

cccccccccgc ctccttcatg  cctctccctt  cccttgatct  cctggttgcc  cagcacctct  13860

tccaaggacc  atcctgctcc  catcctgtct  tcttgccagg  tgtcccctcc  ttaagggagt  13920

ccctgtgac  agccctcagt  ttcccataag  caccctacca  tcaatctttt  tctctggctg  13980

cgattgagct  tcctggttca  gggagtaagt  agtaggtagg  gattcacctc  cttctggcct  14040

tgctgtaatg  agatgctgtt  ttaagggttg  ggctgagggc  tggggctagg  gggtggggtg  14100

gggttagaaa  gacggatcag  tgattaagag  catttgatgt  tcttttagag  cagcggttct  14160

caacctctgg  gtctcaacct  ctttggcaaa  cttctgtttc  caaattattt  acattccgat  14220

tcataactag  caaaattaca  gttttgaagt  agaaatgaaa  ataactttat  ggtttggggg  14280

gacactgcag  agtgaggaac  tgtatttaag  ggtcataggt  cgtagcatca  tgaaggttga  14340

gaactactgt  tttaaaggat  tagttcagtt  cccagcatcc  acatagtgtc  tcctaatgat  14400

ttgtaatggc  tgccttggac  accaagccca  cacatgctgg  acatacatgc  aagcaaaaca  14460

cccatacata  taaaattata  tataatatgt  aagctgggcc  caggatacag  tgtttcagtt  14520

cagtaggtag  catgctggcc  taacacgcac  aagcctctgg  ttcagtcccc  tgcactgaat  14580

aaaatctcca  atagtggttg  ggtgtggtgg  tacatgcatt  taattccagc  actccagaca  14640

cagatgcagg  cagacctctg  ggagtttgag  gccagctact  tagtgagctc  caggtcagtc  14700

caagtgagac  ttggtttcaa  aataaaacaa  atatatacac  acaaagaaac  taaatctgca  14760

tggtggattt  aggaggtaga  ggcaggaggc  tcatctagtc  aaggagagtt  tgtggctagc  14820

ctgggctaca  tgaggccatt  ctgggctaca  tgagcctctg  tctgaaaaca  caaacaaaaa  14880

caaatgaaca  aacaaacaaa  caacaacaaa  aatcccagcc  aggcttggta  acaagcattt  14940

gggagacggc  cataggtgga  cctccgtgag  ttcaggctgc  agagagaggc  cagtttaaaa  15000

ccaaaacgag  acaaaaaggg  atgctcagtg  gtttaagagc  attggctgct  gctcctccag  15060

gggactgagg  tttccttccc  agaacccaca  gggcagctca  caactgtctg  tagctccagt  15120
```

9

```
tccaggggag ctgatgcagt ttccttgcct ccacaggcat ggtgtgtagc acgcagatat   15180

acagacaaac cactcatgca ccaaaggcaa aaataaatta atctaaaaga aaggaaggaa   15240

ggaaggaagg aaggaaggaa ggaaggaaga aagaaagaaa gaaagaaaga aagaaagaaa   15300

gaaagaaaga aagagaaaga aagacaggaa ggaaggaagg aaggaaggaa ggaaggaagg   15360

aaggaaggaa ggaaggaagg aattggacat acagcaggtg gtggtcatgt tgagagaccc   15420

ccaccccagg tgactcccag gcaggtcagg gttaagcaac gcagctcaaa acagaagttt   15480

gcagagtcca ggggattgcc aaatgtgtgg cctgtggaat ctgcttatgt caacagggtt   15540

ggaaggggaa gtgagcagga aaggaagtgg gctgagagct tggcggactc tagtgtgttc   15600

tttctcctcc cccagcccca gccttctgga cccttgggtc ttacacacct atctgttctt   15660

cagatgcagg gctccaaggc ctggggccag agccgccttc ccttgtaacg gtgacctccg   15720

ggagctcaca tccaggaagc tgttacattg cagtagagtc ttctgggatg aaatatgagg   15780

ggctgggaga cgggtcagtg agtaaagtgt ttgccattta aacataagga tatgcgttcc   15840

agcccaggct atggatttgc ctggtacaga ggcacggtgg gttgtgtttg taacctcagc   15900

acgggagagt gagacagatg gatctctagg gcttgctgac cagcaggcct gggttaatca   15960

gtgagcatct agagcaagtt gagagccttg gtctctaaac acaaggtgga aggaaaggga   16020

gggccctgga gaggtggttc ataggtaccg ctctcagcag caagcactct cacctgagga   16080

gccctagccc tagctctact actgagccac actcccagcc cctcattggt gagttcttgg   16140

ttctgttgag ccaggccccc aatcctttgc tggaggattc taggcaaata tcctaacact   16200

gagctgtgca ctgctccaga ccttttatca tcttggcaca tctgttgacc aggtaagtct   16260

cccatgttga ggtgtggaga acactgaggc ctttcaggat gagagagaga gaggagaggc   16320

ctgcatcaca gaatctgtag tgccttgacc cagaagcaat ttcctctaac aacatgactt   16380

tatgctctaa atatcaacag aagaatttgt gaccgcatcc ttctcagcct taagcaaggc   16440

tcagagagaa agacgaccat caggaactgc tgagtgacga gagtccatgt cagggttgag   16500

gccatgtcct gctcggtgtc ctaagcctgc accatgctgt aggtgtatag tttaagacag   16560

tgtactctag ggcacacttt aattcccaca attgggaagc tgaggaaagc aaatctgtga   16620

gtttgaagtc actctggcct acgtgagacc ctgtctcaaa cccaacccaa cccaaatcaa   16680

accaaaccaa acccagccac tatagccaac ttcttttttg ttcttgtcat tactactact   16740

actacaaata ataataataa atatctaata ataattttca ctttaaatat ctgtgcacat   16800

gggcctgtga gagtcacagt ttgtatttga aggtcagagg ctagccttaa ttctagagct   16860

ttcctttcta ctttgagaca gagtctcttg ttgcttgtaa tggcaaaggc cagctggccc   16920
```

10

```
acgtttccag ggattttgac tccctggctg tcttcctttc tgaacgctgg catcacatac   16980

atatactact gaatgtggct attatatggg ttccagaact tcaacctcag gtccccatgc   17040

ttgtgtgacg agcacattcc ccaccaatcc acccatgggg accggacaga tctctcccgt   17100

gagctccccc ttgcctctgc ctccggagtg ctggagtgac aagcatgttc tcctatgcct   17160

gctgtcttcc cattttacag gtaaaaaaac cagaggccca gaaaggggac aggatttgct   17220

tattttgggg catgtggggg tttgagacag ggtttctcta tgtagtcctg gctgtctctc   17280

tgtgactctt ggctggcctc gaactcagag acctgtctga gtgctgtgat caaaggtgtg   17340

cgccaccact gcatgacagg acttgcattt tatgttcccc ggaaacctca ggccctgggc   17400

tcagcttctt gatctttctg aggagggttc attctgggct atcatcctca caacatttga   17460

ggaaggaaag atctttaaga gtctgtggct ggcaggaatg agaggcagag aacagcgcag   17520

ccggtcagtg gagggttagc aggccgctgg tgattactgc agaatcttag gggtccttta   17580

gtgccaaggg tgggtgggaa gtggtttcag agatagccct ccagaccttg ctgttcaaag   17640

cccacacacc tctggcttcc aggaagctga tagtagtgag ctgcgggtg gaggcacaca   17700

ctttcggctt ttccgacctt tctgtctgtg ggttaatttg tgactcacgg ggaggaagaa   17760

aagacaacta tttccctggg gctagcggag gccacgcctg tttttcctgg ttaagaaggt   17820

tgcgcagggt cctcagagaa tcccatagga tctggggaag ggttgcattg ctgagactca   17880

ggcccgctac tgtccctggt ggagagactc tgggcttcct tgcggctgct gaggtctgct   17940

gtgcttgtgc attcggccaa tttgggacca gtcagaagag aggtgaggaa gggaggcata   18000

aaggaggttg cgagaagggg tggagaggct cataatgttt gccttagaag ctttcatttt   18060

gaaatcttgg gagtcagaat tagcattcca gattatatat gttgtatttt cctgagacaa   18120

gagctcatgc tgtccaggct gacctcaaac tcactatgta gttgaggtga tctcgaacac   18180

ccgagtgtcc tgcctccacc tccagagtac agggatcatc aaacacaggt tatgtagtgc   18240

tgggagcaga gctcagggac tttggcactc taccaactga ccacaccccc cagccctgaa   18300

tcatataaaa taatctgttt cattacgaca tttatattat atatgaatgt tcttgagttt   18360

tgctcaaatt caccaccatc tcttttctca tcagcttgta tgttgttgtt gttgttgtta   18420

ttattgatac aaaatatctc tacgtagctc tgactgtctt ggaattcgtt atgtagacaa   18480

ggctggattc acagaaatcc acctccctct gcttccagag cactgggatt aaaggcatac   18540

tcctggctta tacttaaaag tggcaatttg gagctgaaga gatggctcaa tggttaagaa   18600

catgcaatgt tctttcagag gtcctgagtt aggttctcag aacccatctt atcagtggct   18660

tacgaacacc tgtaactcct gctctaggga gtcagatgcc ttcttctggc cccagcaggt   18720

aactgcacac atgtggccaa cacttgtgtg catagacata tgtaaaataa tggcaataat   18780
```

11

```
attttatgta ttgtgtatag agccaaacaa atataaatga tttactgtaa aagaaagcaa   18840

tgtcactggg tgcagaagtg tccatttgta atcccagatg agaaggcaga taagaaaaga   18900

acggtttctt ttactctctg gcccatctgt tgagccagtt ggcaaacttg aggttctgtg   18960

agatatccag tctgaaaaaa tgtggagggc tggagggtgt ggctcagtgg tagaccccct   19020

gcctagaatc ccccagtgag gggctggggg cgtggctcac agccggagcc ccttgttaag   19080

ctggaaagcg ggagatagcg cgagatagag aggggggtag acggagagag agagagcgag   19140

agagagagag agagagagag agagagagag aacatgaatt ctgggaacca tccttgtctc   19200

tctttacaga ggaaatacca taggctgata gtgactgagt acagaaactg tcccagacta   19260

ttatcagtag tagctgtgaa gggtggggtc agagatggga agagaggtag tgataacagc   19320

agttcacaca cacatacaca cacacacaca cacacacaca cacacacaca cacacacaca   19380

caaacacaca cacgagcagg cacaccctgt ctgctgtttg ctgtggacga gcactgtggc   19440

agcctgtctc catagcagat ccgctaacta cactgactat ccgcagcgct cgctctccca   19500

ggtggggtct gtgattatcc ctatacaggt acacagagat ccgcagctt gttgaaggcc   19560

acacagctat tgaagctttg agtttttgta ctcttgttat gctctatatt gcttgttttg   19620

tttgtttgtt ttgagatgag ggtcttaact tatagcccag gttggcctca aaatcatggc   19680

atttctcctg cttcagcctc tgagtgctgg ggtgacaggt gagtttttgt tttgttttgt   19740

ttttaaacag gtacagttta ctttaaggaa ggaaaactac tcagaaaaat ggcttggcct   19800

catagctggc tacctggcag agctgagagt gtcccaattt ccgttctgtc cttcctgttt   19860

taacagtgtt ggccaaggct ttgggcagtg ccagacaacc cataaatagt cagatgagag   19920

ctgcaggttc cagccactcc agacatgggg ttgggtgtcc cctcccgccc aggtcctgtc   19980

cttccccgcc tgctttgtgt cttgtgtgtg tttcttaggc tttagttctt ctgtcccacc   20040

aaactggtga ctgggtcct agaggaggat gtgcacagac agagccagcc gtgactgcgg   20100

gtcagctcag ggccacgggg atacacggct gactagcttc ccagtttctc acatctgggg   20160

ccggtaatat ttctggactc cctagggaca cgctgcaatt cagttctgtc ttcttagctg   20220

agtgatttta actaagttac tcaccctctc tctgcctctt tagctgcaga atcggcttac   20280

caagactgta tcaaaacaca gtgttgaaag gtgtttgggg ccaggccttg cacgtgcaca   20340

aaatggtgcc ctctaatatc ctaaaactat tattattatt ttattaggta attttgtgtc   20400

ttagttaggg tttttattgc tgtgaagaga caccatgagg ggctgggggc gtgactcagt   20460

ggtagaacac ccacctaaaa ttccccaggg gcacacgcaa ctctctctct ctctctctct   20520

ctctctctct ctctctctga cagggtttct ctgtgtagcc ctggctgtcc tggaacttgc   20580
```

12

```
tttatagacc aggctggcct caaactcaca gagatccctc tgcctctgct ccaagtgctg    20640

gaattaagtt gtacaccacc actgcctggc taattatttc tatcttaata gtttcttttc    20700

ctgttgcttg tgatgaaata ctccacagcc agatgtggtg cacactttt ttatcccaag    20760

acacttggga ggcagaggta ggtaaatttc tgtgagtttg gggccattct ggtctacata    20820

aaatactctt aaagggctac ttaagggaga aggtacttat tatagattat tatatattat    20880

gtcattatat attatatata atctagagaa ttaatattat aatatttcta taatacatac    20940

tatgtaatat aatattaata tcaatacaat tatattatct actattcatt atacattaat    21000

atata                                                                 21005


<210>  2
<211>  2328
<212>  DNA
<213>  Homo sapiens

<400>  2
aggggggagcc caggagacca gaacatggac tccttcaatt ataccacccc tgattatggg      60

cactatgatg acaaggatac cctggacctc aacaccctg tggataaaac ttctaacacg       120

ctgcgtgttc cagacatcct ggccttggtc atctttgcag tcgtcttcct ggtgggagtg       180

ctgggcaatg ccctggtggt ctgggtgacg gcattcgagg ccaagcggac catcaatgcc       240

atctggttcc tcaacttggc ggtagccgac ttcctctcct gcctggcgct gcccatcttg       300

ttcacgtcca ttgtacagca tcaccactgg cccttggcg gggccgcctg cagcatcctg       360

ccctccctca tcctgctcaa catgtacgcc agcatcctgc tcctggccac catcagcgcc       420

gaccgctttc tgctggtgtt taaacccatc tggtgccaga acttccgagg ggccggcttg       480

gcctggatcg cctgtgccgt ggcttggggt ttagccctgc tgctgaccat accctccttc       540

ctgtaccggg tggtccggga ggagtacttt ccaccaaagg tgttgtgtgg cgtggactac       600

agccacgaca acggcgggga gcgagccgtg gccatcgtcc ggctggtcct gggcttcctg       660

tggcctctac tcacgctcac gatttgttac actttcatcc tgctccggac gtggagccgc       720

agggccacgc ggtccaccaa gacactcaag gtggtggtgg cagtggtggc cagtttcttt       780

atcttctggt gccctaccca ggtgacgggg ataatgatgt ccttcctgga gccatcgtca       840

cccaccttcc tgctgctgaa taagctggac tccctgtgtg tctcctttgc ctacatcaac       900

tgctgcatca accccatcat ctacgtggtg gccggccagg cttccagggg ccgactgcgg       960

aaatccctcc ccagcctcct ccggaacgtg ttgactgaag agtccgtggt tagggagagc      1020

aagtcattca cgcgctccac agtggacact atggcccaga agacccaggc agtgtaggcg      1080

acagcctcat gggccactgt ggcccgatgt ccccttcctt cccggccatt ctccctcttg      1140
```

13

```
ttttcacttc acttttcgtg ggatggtgtt accttagcta actaactctc ctccatgttg    1200

cctgtctttc ccagacttgt ccctcctttt ccagcgggac tcttctcatc cttcctcatt    1260

tgcaaggtga acacttcctt ctagggagca ccctcccacc ccccaccccc ccccacacac    1320

catctttcca tcccaggctt ttgaaaaaca aacagaaacc cgtgtatctg ggatatttcc    1380

atatggcaat aggtgtgaac agggaactca gaatacagac aagtagaaag attctcgctt    1440

aaaaaaatgt atttatttta tggcaagttg gaaaatatgt aactggaatc tcaaaagttc    1500

tttgggacaa aacagaagtc catggagtta tctaagctct tgtaagtgag ttaatttaaa    1560

aaagaaaatt aggctgagag cagtggctca cgcctgtaat cccagaactt gggaggcta    1620

aggtgggtgg atcacctgag gtcaagagtt ccagaccagg ctggccagca tggtgaaacc    1680

ccgtctgtac taaaaataca aaaaattaac tgggcatggt agtgggtgcc tgtaatccca    1740

gctacttggg aggctgaggt gggagaattg ctcgaacctt ggaggtggag gttgtggtga    1800

gccatgatcg caccactgca ctctagcctg ggtgaccgag ggaggctctg tctcaaaagc    1860

aaagcaaaaa caaaaacaaa aacacctaaa aaacctgcag ttttgtttgt actttgtttt    1920

taaattatgc tttctatttt gagatcattg caaactcaac acaattgtaa gtaatgatac    1980

agagggatct tgtgtaccct tcacccagcc tcccccaatg gcaacatctt gcaaaactac    2040

aatgtagtct cataaccagg atattgacat tgatacagtg aagatacagg acattctcat    2100

caccacaggg atccccagga tgcccacttc cctccacccc cacaccccag ccgtgtccct    2160

aacccctggc aaccaggaat ccactctcca tttctataat gttgtcattt caagaatgtt    2220

attcaatgga atcatatagt atgtaacctg ttttgagctt aaaaaaaaaa gtatacatga    2280

ctttaatgag gaaaataaaa atgaatattg aaaaaaaaaa ctttagag                 2328


<210>   3
<211>   350
<212>   PRT
<213>   Homo sapiens

<400>   3

Met Asp Ser Phe Asn Tyr Thr Thr Pro Asp Tyr Gly His Tyr Asp Asp
1               5                   10                  15



Lys Asp Thr Leu Asp Leu Asn Thr Pro Val Asp Lys Thr Ser Asn Thr
            20                  25                  30



Leu Arg Val Pro Asp Ile Leu Ala Leu Val Ile Phe Ala Val Val Phe
        35                  40                  45



Leu Val Gly Val Leu Gly Asn Ala Leu Val Val Trp Val Thr Ala Phe
```

14

Glu Ala Lys Arg Thr Ile Asn Ala Ile Trp Phe Leu Asn Leu Ala Val
65   70   75   80

Ala Asp Phe Leu Ser Cys Leu Ala Leu Pro Ile Leu Phe Thr Ser Ile
                85   90   95

Val Gln His His His Trp Pro Phe Gly Gly Ala Ala Cys Ser Ile Leu
            100   105   110

Pro Ser Leu Ile Leu Leu Asn Met Tyr Ala Ser Ile Leu Leu Leu Ala
            115   120   125

Thr Ile Ser Ala Asp Arg Phe Leu Leu Val Phe Lys Pro Ile Trp Cys
        130   135   140

Gln Asn Phe Arg Gly Ala Gly Leu Ala Trp Ile Ala Cys Ala Val Ala
145   150   155   160

Trp Gly Leu Ala Leu Leu Leu Thr Ile Pro Ser Phe Leu Tyr Arg Val
            165   170   175

Val Arg Glu Glu Tyr Phe Pro Pro Lys Val Leu Cys Gly Val Asp Tyr
            180   185   190

Ser His Asp Lys Arg Arg Glu Arg Ala Val Ala Ile Val Arg Leu Val
            195   200   205

Leu Gly Phe Leu Trp Pro Leu Leu Thr Leu Thr Ile Cys Tyr Thr Phe
    210   215   220

Ile Leu Leu Arg Thr Trp Ser Arg Arg Ala Thr Arg Ser Thr Lys Thr
225   230   235   240

Leu Lys Val Val Val Ala Val Val Ala Ser Phe Phe Ile Phe Trp Leu
            245   250   255

Pro Tyr Gln Val Thr Gly Ile Met Met Ser Phe Leu Glu Pro Ser Ser
            260   265   270

Pro Thr Phe Leu Leu Leu Asn Lys Leu Asp Ser Leu Cys Val Ser Phe
            275   280   285

Ala Tyr Ile Asn Cys Cys Ile Asn Pro Ile Ile Tyr Val Val Ala Gly
    290   295   300

15

```
Gln Gly Phe Gln Gly Arg Leu Arg Lys Ser Leu Pro Ser Leu Leu Arg
305                 310             315             320

Asn Val Leu Thr Glu Glu Ser Val Val Arg Glu Ser Lys Ser Phe Thr
                325             330             335

Arg Ser Thr Val Asp Thr Met Ala Gln Lys Thr Gln Ala Val
            340             345             350
```

```
<210>    4
<211>    22
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Primer

<400>    4
tggactacag ccacgacaaa cg                                                    22


<210>    5
<211>    22
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Primer

<400>    5
aggaaggaca tcattatccc cg                                                    22


<210>    6
<211>    21
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Primer

<400>    6
caccagcccc gagatttttt c                                                     21


<210>    7
<211>    18
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Primer

<400>    7
tcagaaacca gatggcgt                                                         18
```